CHAPTER 3

Instrument design and data acquisition

In this chapter the research design and data acquisition are described. In section 3.1 the determination of the bottom of the pyramid in South Africa is detailed. The sampling methodology is discussed in 3.2 with validation of the sample size covered in section 3.3. In section 3.4 the research instrument development is discussed in detail including issues of question development, question bias, scales and the overall structure of the questionnaire. The construct development to test the proposed model is described in section 3.5 including tests of construct reliability and validity. In section 3.6 descriptive statistics of the sample are described. Factors associated with being unbanked at the bottom of the pyramid in South Africa are also reported. In section 3.7 a comparison between the adoption propensities of bottom of the pyramid people to make use of intermediaries compared to traditional banks is discussed. The chapter is closed with the conclusion in section 3.8.

3.1. Determination of the bottom of the pyramid in South Africa

The study focused on understanding financial service adoption through an intermediary at the bottom of the pyramid. It was thus necessary to determine the bottom of the pyramid in South Africa. The term “Bottom Of the Pyramid” was first proposed in an article published in 2002 (Prahalad and Hart, 2002). The authors divided the global population into four tiers in the shape of a pyramid. At the bottom of this pyramid were 4 billion people whose per capita income based

on purchasing power parity was less than $1,500, the minimum considered necessary to sustain a decent life. Whilst this presented an untapped market for corporations, investing in the bottom of the pyramid would potentially mean lifting billions of people out of poverty.

Lifting people out of dire economic conditions would avoid social decay, political chaos, terrorism and environmental meltdown that could arise if the gap between the rich and poor continued to widen (Prahalad and Hart, 2002). The per capita income translated into surviving on less than $4.11 per day. In a subsequent paper on the same topic (Prahalad and Hammond, 2002) it was argued that consumers at the bottom of the pyramid pay higher prices for goods and services when compared to middle-class consumers. A book was subsequently published (Prahalad, 2006) in which the author argued that serving bottom of the pyramid customers was not only a profitable opportunity for corporations, but also a social imperative. By addressing the bottom of the pyramid corporations could curtail poverty and improve the living conditions of the world's poorest (Prahalad, 2006).

To conduct the research it was necessary to identify the bottom of the pyramid in South Africa. The Living Standards Measure (LSM) was used to segment the population and identify the sample that met the criteria for bottom of the pyramid. The South African Advertising Research Foundation (SAARF) developed the LSM methodology in the 1980's for market segmentation. The LSM methodology categorises the entire South African population into 10 categories labelled LSM 1 to LSM 10. The LSM is a household level multi-attribute segmentation tool based on access to services, durables goods and geographic indicators as determinants of the standard of living of a household.

For the LSM segmentation, respondents are scored on the presence or absence of each of 29 variables in their household. The score, either 1 for present or 0 for absent, is multiplied by a weighting factor and summed. The 29 variables and the weighting associated with each variable are included in appendix 8.1.

The LSM category is determined from the final summated score and compared to the LSM classification table. The classification table for LSM groupings is included in the appendix 8.2. The SAARF updates the LSM measures regularly and the most recent list of variables and weightings for the index was released in February 2012. The field research was conducted in 2011 and the classification table, variables and weightings were those in use for the 2008 – 2012 period. The new and older measures are compatible and respondents will have been placed in the correct LSM with either measure. The LSM methodology has been widely used for market segmentation and understanding living conditions in South Africa (Møller, 1997; De Jager, 2004; Martins, 2004). The LSM was designed to avoid the use of unreliable self-reported income as a basis for segmenting a population. The LSM segmentation tool has been used as the primary basis for segmentation in research on financial inclusion (Finscope 2010, 2011).

While LSM measures do not explicitly take income into account, work has been carried out linking average household income to LSM (SAARF, 2011). This linking of LSM to household income allows the determination of the bottom of the pyramid in South Africa based on income. In table 3.1 below the LSM is shown along with the average monthly household income, average household size and daily $ equivalent income per person. During 2011, the time period when the fieldwork was conducted, the average exchange rate was $1 = R7.264. The

average household size for LSM 1-6 was obtained from the research data, whilst the average household size for LSM 7-10 was obtained from the Finscope study into financial inclusion (Finscope, 2011). From the income comparisonrelative to the definition of Prahalad (2002) it was concluded that LSM 1-4 covers the bottom of the pyramid in South Africa.

Table 3.1: Daily per capita income as a function of LSM

LSM	Income	Household size	Daily income R	Daily income $
1	R1 363	3.0	R14.94	$2.06
2	R1 929	3.8	R16.74	$2.30
3	R2 258	3.8	R19.34	$2.66
4	R3 138	4.1	R25.48	$3.51
5	R4 165	4.2	R33.00	$4.54
6	R6 322	4.4	R46.82	$6.45
7	R10 255	4.0	R84.31	$11.61
8	R14 014	4.0	R115.21	$15.86
9	R19 654	3.6	R179.53	$24.71
10	R29 512	3.6	R269.58	$37.11

3.2. Sampling methodology

In order for the results of this study to be applicable to the entire bottom of the pyramid population in South Africa, a sample that reflected the national geography of South Africa including its 9 provinces, 11 official languages and various ethnic groups was required. Many of the ethnic groups in South Africa reside in specific geographies, whilst there are also significant differences between urban and rural populations. It is thus difficult to obtain a

representative sample without undertaking a national survey. Due to the scope of such an exercise it would have been impossible for the researcher to undertake the data collection without logistical assistance. A research company, TNS Research Surveys, was appointed to provide logistical support for the work and to undertake the data gathering. TNS research surveys are a specialist survey company that undertakes research surveys for large clients across South Africa. TNS has been active in this field in South Africa since 1979. After development of the research instrument TNS undertook the field work over a period of 12 weeks.

To conduct a national survey and obtain a sample that represented the entire country it was decided to make use of enumerator area (EA) as the basis for data collection. In using this approach the work of a leading sampling expert, Dr Ariane Neethling from the University of Stellenbosch, was consulted. When drawing the sample, the EA framework used for this research was based on the 2001 Census demarcated EA. This was updated to be in line with the 2008 community survey and national population estimates (StatsSA, 2008). From the data collected at the municipal level in the community survey 2008 it was possible to determine a mean LSM for the 227 municipalities that made up 46 district or metropolitan municipalities. The 46 regional municipalities made up the 9 national provinces. A proportionally weighted sample of 650 EA was selected. A cut-off of LSM 1-6 was chosen for inclusion of EA in the sample. This cut-off ensured that the majority of South Africa's population based on LSM was covered.

Household level data was collected and no special institutions where people resided but were not consider a household, were included in the survey. Special

institutions were defined as prisons, hospitals and clinics, schools and school hostels, universities, caravan parks and old age homes. Once the areas for data collection were identified, the households to interview in the area were pinpointed. On arrival at the EA fieldwork teams travelled through the area to orientate themselves and determine which homes fell within the EA. To identify the respondent in the home to be interviewed, a Kish grid was used. This approach required the interviewer to record all the individuals at that visiting point who were 16 years or older at the time and who resided there for more than four nights of the week. Using the Kish grid an individual who was 16 years or older was randomly selected to complete the interview. Where respondents were not be available at the time that a home was visited, the interviewer made a further attempt to contact a respondent. If, after a second attempt, the interviewer could not complete the interview the first of the substitute points was selected.

Following these steps produced a randomly selected area, randomly selected house within the selected area andrandomly selected person to interview. The questionnaire was administered in field between July and September 2011 and took on average 75 minutes per respondent to complete. Based on the costs associated with the exercise and the total number of interviewers deployed, a target of at least 2,000 completed surveys was planned for collection over the 12 week fieldwork period. Ultimately 1997 fully completed interviews were collected. From the LSM classification it was determined that 695 respondents in the sample could be classified as bottom of the pyramid. The total LSM 1-4 population of adults 15 years and older in South Africa was 10,542,000 (SAARF, 2011). The sample consequently had a 3.72 percent confidence interval at a 95

percent confidence level. The specific research interests were in those at the bottom of the pyramid who was unbanked, i.e. did not hold a bank account of any description. Out of the sample of 695 a total of 341 respondents did not hold a bank account.

3.3. Sample size

It was important to establish that the study had an adequate sample size. This was necessary to ensure that the study had a good chance of detecting a statistically significant result. To further to ensure that hypothesis were not incorrectly accepted or incorrectly rejected, the sample was checked for appropriate size. Two types of error may arise as a consequence of insufficient sample size. Type I and type II errors are terms used to describe where a true null hypothesis was incorrectly rejected. A Type I error is the incorrect decision that is made when a test rejects a true null hypothesis (H_0). The rate of the type I error is denoted by α and equals the significance level of a test. In the case of a simple null hypothesis α is the probability of a type I error. Setting α above 0.05 ensured that the null hypothesis was not incorrectly rejected. A type II error is the incorrect decision that is made when a test fails to reject a false null hypothesis.

The rate of the type II errors is denoted by the Greek letter β and is related to the statistical power of a test. The statistical power of a test is defined as $(1-\beta)$. A target value of statistical power of above 80 percent is normally desired (Lipsey, 1989). A study with this power level implies that if there is a difference between two groups, there is an 80 percent chance of correctly detecting it as statistically significant. When the sample size is small a study is particularly

susceptible to a type-II error. Simon (1999) suggested an informal rule that α is set to 0.05 and β to 0.2 for adequate sample size. Power in this scenario is 0.8. An additional consideration in determining adequate sample size for a study is to deal with effect size, denoted by d. Effect size quantifies the size of the difference between two groups and may therefore be said to be a true measure of the significance of the difference.

If two samples from the same population were taken there would always be a difference between them. The statistical significance is usually calculated as a 'p-value', the probability that a difference of at least the same size would have arisen by chance, even if there were no difference between the two populations. By convention, if $p < 0.05$ the difference is taken to be large enough to be statistically significant. A number of problems arise in using statistical significance in this manner (Cohen, 1994; Harlow et al., 1997). The primary problem is that the p-value depends on two factors viz. the size of the effect and the size of the sample. A statistically significant result could occur either if the effect were very big (despite having only a small sample) or if the sample were very big (even if the actual effect size were small). It is important to know the statistical significance of a result, since without it there is a danger of drawing firm conclusions where the sample is too small to justify such a conclusion.

Guidelines on reporting size effect have been proposed (Cohen, 1988). In terms of this guidance, effect sizes were defined as small, d = 0.2, medium, d = 0.5 and large, d = 0.8. In order to determine the effect size and power of the sample G*Power software, version 3.1 was used (Erdfelder et.al,1996; Faul et.al, 2009). G*Power computes power values for given sample sizes, effect sizes and α levels.

It further computes sample sizes for given effect sizes, α levels and power values. With N=341, α = 0.05 and $(1-\beta)$ = 0.80 the effect size of the sample was 0.152, which was below the cut off for small effect size. Using the parameter for small effect size (0.20), it was determined that the power of the sample with a α of 0.05 and an N = 341 was 0.957. This was above the cut-off of 0.80, which is considered acceptable to detect small effect sizes in the sample. It was concluded that the sample size of 341 was sufficient to exclude type II errors.

3.4. Instrument development

The most commonly used instrument for collection of data in a standardized manner from a large population is a questionnaire. Questionnaires are a useful tool for investigating patterns in data and are used with success in management, marketing, consumer and policy research (Easterby-Smith et.al, 1993). Questionnaires have also been used as the primary data collection methodology in the Finscope study into financial inclusion in South Africa (Finscope 2010, 2011). In all cases the role of the questionnaire is to provide a standardized interview across subjects. This is to ensure that all respondents are asked the questions that are appropriate to them and so that, when those questions are asked, they are always asked in exactly the same way (Brace, 2008). The researched decided to make use of a questionnaire-based survey, as there was no practical alternative method to accurately collect standardized data from a sizeable population spread out over a large geographical area.

In evaluating questionnaires four types of questionnaire were considered – interviewer face-to-face, self-completion using paper, self-completion using electronic means and telephone based. The use of self-completed paper based

questionnaire was considered and rejected. There were a number of reasons for this rejection. Logistically it was not clear how a national self-completion survey could be distributed and collected. One of the main disadvantages of self-completed questionnaires is that the researcher has no control over who actually completes the questionnaire. It is also difficult to ensure that the respondent completes all the questions before returning the questionnaire and there may be problems with literacy or language that are difficult to identify. Good response rates would therefore be difficult to achieve. Electronic self-completion was deemed impractical given the low Internet penetration rate in South Africa and the expected low rate of home computers in the target population. It was further expected that the bottom of the pyramid portion of the population would have the lowest levels of Internet penetration and online access in the entire population. There was also no easy mechanism to identify the target population online and it was likely that any sample would have been biased towards more educated populations.

A telephone-based survey was rejected, as there was no publicly available database of contact numbers for the target population at the time of the research. The nature of the research topic would furthermore have produced telephone calls exceeding 1 hour for completion and this may have produced very low response rates. Legislative barriers in South Africa further prohibit companies calling citizens without first obtaining their consent to sell, market or research products or services. It was consequently decided to gather the data through an interviewer administered national survey. An interviewer-administered approach has additional advantages over the three alternatives. Research comparing the four types of questionnaire application - interviewer face to face,

telephone, self-completion paper based and self-completion electronic has been conducted (Bowling, 2005). Setting aside the logistics issues related to non face to face interviews it was found that face to face interview scored high on complete population coverage for sampling, had the lowest cognitive burden on respondents, scored the lowest for response choice order effects and scored the highest for respondents preferences for modes of administration compared to the alternatives.

3.4.1. Question development

In developing the questions in the questionnaire the literature was reviewed to identify best practices to incorporate in the design. Results of a multi-level analysis indicated that questions or statements on a questionnaire should be kept as short as possible in order to increase respondents' comprehension (Holbrook et al, 2006). For the English language, Brislin (1986) specified a maximum number of 16 words, while Oppenheim (1992) recommended 20 words, per sentence. In addition it has been reported data quality increased if questions or groups of questions concerning the same topic were preceded by a medium-length introduction (Blair et al. 1977; Andrews 1984). For each group of questions in the questionnaire a brief introduction to the section that was included. The interviewer read out this introduction before the questions were posed to the respondent.Various authors proposed that grammatical complexities should be kept to a minimum when formulating questions. Questions should employ the active rather than the passive voice, repeat nouns instead of using pronouns and avoid possessive forms (Brislin 1986; Dillman 2000; Dörnyei 2003). In this way cognitive demands on respondents are minimised and mental

capacity is freed up in order to think about a response. All questions in the questionnaire were kept in the active voice.

A meta analyses showed that the invalidity of responses due to cognitive overload increases where recall of events is involved that have occurred not in the immediate past (Sudman and Bradburn, 1974; Bhandari and Wagner, 2006). Where information regarding past events was sought respondents were provided with a choice of time-defined answers. Only one section of the questionnaire required recollection of past events and in that section respondents were provided with previous time choices of “in the last month”,” in the last 12 months” and “longer than 12 months”. The worth of simplicity in question wording has been emphasized and the use of difficult vocabulary either in questions or instructions may lead to respondents feeling stupid or uneducated. It was reported that this increased the probability of obtaining ‘don’t know’ or socially desirable responses (Foddy, 1993). Socially desirable responses could lead to answers that inaccurately reflect respondents’ actual behaviours. Questions in the questionnaire were kept to as simple a language as possible and socially contentious questions such as "I think that crime in our country is a problem" were avoided.

Negatively worded questions or statements should be avoided (Belson 1981; Foddy 1993) as they have been found to take longer to process and have a greater likelihood of respondents making mistakes (Eifermann 1961; Dudycha and Carpenter 1973). The use of negatively worded questions was avoided in the questionnaire.Attention was further paid to order effect in the questions. Question order effects arise when answering behaviour changes depending on the

position of a question during the interview (Schuman and Presser 1996; Baker 2003). Question order effect is problematic in that it not only threatens the validity of the results but also the generalizability of results to the population. Systematic research into this issue has been inconclusive as regards the answering behaviour in response to specific questions. For general questions results tended to show that the general question is more appropriately placed before the specific question. Demographic questions about respondents, such as age, education, income and marital status, should come at the end of the questionnaire rather than at the beginning in order to avoid negative feelings about the provision of personal information impacting on the answering behaviour or participation (Converse and Presser 1986; Oppenheim 1992). The guidance in respect of order effect was followed and the demographics section of the questionnaire covering aspects of age, home language, marital status and education levels was included as the final section of the questionnaire before the interview was closed.

3.4.2. Question bias

Bias in questionnaires is an important issue that was also addressed. To collect the most accurate data from respondents, interviewers should understand and be able to prevent or at least minimize bias in the design of questionnaires. Two types of interviewer bias considered could arise in interviewer-administered questionnaires (Choi and Pak, 2005). Interviewer bias could be caused by an interviewer's subconscious or even conscious gathering of selective data. If, for example, an interviewer knows that the respondent does not have a smoking-related disease and therefore is unlikely to be a smoker, he or she may rephrase the question and ask instead, "You don't smoke, do you?" Interviewer bias could

produce leading questions and is likely to lead to a negative answer. Printing each question to be asked on the questionnaire and training the administrators to read the question to the respondent minimized this bias. Non-blinding bias occurs when an interviewer is not blind to the study hypotheses. He or she may consciously gather selective data. None of the research hypothesis was shared with the administrators as a method of dealing with this bias.

3.4.3. Questionnaire scales

For the responses to the questions, an appropriate scale needed to be chosen. A number of authors (Dillman 2000; Fink 2003) reported that between 5-point and 7-point Likert scale response options were the most commonly used scales in questionnaire based scale responses. The 7-point scale has been shown to be more reliable as it allows for greater differentiation of responses than the 5-point scale (Finn 1972). Shorter scales, such as 5-point scales, were preferable in situations where respondents are asked for absolute judgments. In contrast longer scales such as 7- to 9-point scales are more appropriate in situations where more abstract judgments are sought from respondents (Foddy, 1993). As the responses sought in the research required absolute judgments, a 5-point Likert scale was chosen for the majority of questions. The following descriptors were used for the scale - strongly disagree, disagree, neither agrees nor disagrees, agree, strongly agree.

In order to accommodate respondents who were unfamiliar with the question or who felt that the question was no applicable to them two additional categories to the 5 point Likert scale, namely don't know and not applicable, were included. Five of the questions in the survey required respondents to provide a score on a

response scale. Evidence from studies (Fowler 1995; O'Muircheartaigh et al. 1995) has shown a greater likelihood for respondents to choose positive ratings on a bipolar numeric scale than on a unipolar numeric response scale. This finding held for topics as different as the entertainment value of movies and TV to general life satisfaction. A bipolar numeric scale (-5;5) was not used but used but a unipolar (1-10) scale was when this was required.

3.4.4. Questionnaire structure

The centre of the questionnaire framework involved situating people in the context of their households and community. Table 3.2 shows the 14 sections in the questionnaire and the number of questions in each section

Table 3.2: Questionnaire structure

Section	Focus	Questions
S	LSM screening questions	1
A	General and financial attitudes	3
B	Banking usage	4
C	Access to services in community	5
D	Exploration of livelihood	16
E	Sources of income and barriers to income generation	9
F	Financial tasks, payment places and channels	11
G	Pivotal events, financial risks and coping strategies	12
H	Savings behaviour	7
I	Access and attitudes to technology	2
J	Financial provider perceptions	1
K	Focus on the Post Office	6

L	Lifestyle indicators	1
M	Demographics	13

The researched decided to obtain as much relevant data from the target population as possible. From an individual response the researcher wished to identify demographics, including age, gender, race geography and income. The researcher also wanted to understand the role of money and the financial tasks the individual undertakes on a daily, weekly and monthly basis. From a household perspective the researcher wanted to understand a number of aspects. The role of money in people lives and what the financial tasks were at a daily, weekly and monthly level and what key events in their lives required money as well as respondents livelihoods including educational and economic capability, income vulnerability, financial planning capacity and ability to handle financial trauma were sought. Attitudes are often important predictors and the questionnaire sought to explore attitudes and perceptions to life, money and service providers. Finally the researcher wanted to understand the social networks respondents belonged to. The researcher delved into the needs of respondents, both current and the desired future states as well as triggers that could lead to an expansion or deepening of financial engagement and the use of technology. From a community perspective the researcher sought to identify access to infrastructure and access to facilities within the communities for respondents.

In order to access all the areas of the framework the questionnaire had 14 sections. The full questionnaire is included in appendix 8.3 along with the show cards developed to show to respondents in appendix 8.4.Section S covered LSM screening. The aim of this section was to ensure that data from the respondent

could be used to post hoc determine their LSM. Section A exploredrespondent's attitudes toward life and finances and to help understand claimed behaviour with respect to money. In section B banking penetration was covered and its aim was to establish at a high level respondents banking status and whether they used their own or someone else's banking account. This section also explored lack of documentation as a barrier to access. Section C covered access to services. This section sought to understand which services were available in the community at the time of the survey. In section D livelihoods were dealt with and the reality of respondents day-to-day lives was established. The relevance of products and services to respondents living situations and how those could be complimentary to existing networks in the community was explored.

Section E explored respondent's financial ability in terms of employment and other sources of money to pay for expenses. Possible barriers to earning money and discretionary spending power were also explored to give a sense of what product or service interventions were relevant and sustainable. In section F financial tasks were studied. The objective was to explore what people did with their money and how they managed daily, weekly and monthly financial tasks. Section G dealt with events, borrowings and payments. This section allowed determination of financial risks those respondents had to deal with and coping strategies that respondents put in place.

Section H covered savings, in particular how respondents saved and section I dealt with access and attitudes toward technology. The aim of this section was to understand respondent capabilities in terms of using technology and the relevance of particular channels in order to identify relevant ways of delivering

products and services. Section J covered perceptions relating to financial providers. Section K was a section specifically covering the South African Post Office (SAPO). The research focussed on the SAPO as an intermediary for the provision of financial services and the intent of this section was to understand desire for the proposed services offered by the SAPO. Section L covered lifestyle indicators used to assess poverty levels in the household while section M covered demographics. This section was used to gain a full and detailed understanding of individual and household demographics that could be used for the modelling and profiling.

3.5. Model construct development

For each of the constructs in the proposed model identified in section 3.4, relevant questions that tested the proposed construct were identified. Table 3.3 shows the latent constructs and the questions that tested the indicative variables drawn from the questionnaire to define the construct.

Table 3.3: Latent constructs of the hypothesized model and associated variables.

Factor	Variables
BI	Q147E: It would be good for you to bank through the Post Office
	Q147H: You would be keen to try banking products offered at the Post Office:
	Q152D: If you were to do banking, you would be willing to bank at the Post Office.
TSE	Q156D: Confidence using technology – Mobile money transfer (sending or receiving money)
	Q156E: Confidence using technology - ATM
	Q156G: Confidence using technology – Withdrawing cash at a supermarket till using your ATM or bank card

	Q156H: Confidence using technology – Getting bank notification via SMS
SOC	Q152J: You would bank at the Post Office if someone you respect like your favourite radio show presenter or DJ does
	Q152G: You would bank at the Post Office if your chief or community elders do.
	Q152A: You would bank at the Post Office if your family, friends or neighbours do.
PU	Q147C: You would use the Post Office to do banking because it would offer the services that you need.
	Q147G: Banking at the Post Office would help you do things you already do but better.
	Q147J: Banking at the Post Office will allow you to do banking services that you cannot do yet.
PEOU	Q147B: Post Office banking products will be easy to understand.
	Q147D: The Post Office will make banking easier.
	Q147K: You would trust the Post Office for your banking
	Q147M: Banking through the Post Office will be easy to use.
	Q147L: Banking through the Post Office will be quicker than at normal banks.
ATT	Q142: Overall Postbank concept rating
	Q143: Postbank concept rating with regard to banking services.
	Q144: Postbank concept rating with regard to government services.
	Q145: Postbank concept rating with regard to other services.
TASK	Q135M: They speak your own language – Post Office
	Q135AC: They treat you well – Post Office
	Q135AS: You can depend on them to get things done – Post Office.
	Q135BA: They are cheap to use – Post Office
HED	Q152H: Banking at the Post Office will be comfortable.
	Q152E: You feel comfortable enough in a Post Office to try using an ATM.
	Q152C: Banking at the Post Office will be enjoyable.

The questions in table 3.3 were taken from previous empirical research into financial exclusion (Finscope 2010, 2011), and adapted accordingly. Behavioural intent (BI) in the original TAM proposed by Davis (1989) described the behavioural intention of the subject to use a system. In this research three questions were identified that demonstrated a future intent to use financial services provided through an intermediary. All three variables were scored on a 5-point Likert scale. The technology self-efficacy (TSE) construct relates to the belief that one is capable of performing in a certain manner to attain certain goal. This construct assessed respondent's self-confidence in using technology for financial services. This is a four variable factor and all variables were dichotomous. A total of three questions were drawn from the questionnaire to form the social (SOC) construct. This construct was defined as relating to how an individual perceives himself or herself within their broader social context and in particular how they perceive that others would view their decisions. All variables were on a 5-point Likert scale.

Perceived usefulness (PU) was defined as how useful banking through an intermediary would be. This was a three variable factor and all variables were on a 5-point Likert scale. Perceived ease of use (PEOU) was defined as the degree to which a person believes that adopting the system will be free of effort. For this construct questions related to how easy services through an intermediary would be to use were identified. Five questions made up this construct and all were scored on a 5-point Likert scale.ATT defined the attitude construct where it describes predisposition or a tendency to respond positively or negatively towards a certain idea. Attitude influences an individual's choice of action. This was a

four variable scale and each of the variables was scored on a 10-point numeric scale where 1 was terrible to 10 being excellent.

The TASK construct relates to aspects of executing the task. It encapsulates the information, effort, expected performance and resource expectancy a customer has in executing the tasks associated with the using financial services through an intermediary. A total of four questions comprised this construct. All variables were scored on a 5-point Likert scale. The hedonist (HED) construct described adoption in terms of self-fulfilling rather than instrumental value to the user. It related to how comfortable and enjoyable a user would find the activity. A total of three variables comprised this construct. All variables were scored on a 5-point Likert scale.

3.5.1. Construct reliability and validity

The two most important and fundamental characteristics of any measurement procedure are reliability and validity. These two principles will be discussed in turn. In relation to construct definition reliability is defined as the extent to which a questionnaire, test, observation or any measurement procedure produces the same results on repeated trials. In short, it is the stability or consistency of scores across raters. The reliability of the latent constructs was evaluated by measuring the internal consistency, or the extent to which items on the questionnaire measured the same thing. The reliability of the scalewas determined using the Cronbach's α. Cronbach's α is a coefficient of reliability and is commonly used as a measure of the internal consistency or reliability. Cronbach's α is defined as;

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\Sigma_{i=1}^{K}\sigma_{Y_i}^2}{\sigma_X^2}\right) \quad [3.1]$$

where K is the number of items, σ_X^2 the variance of the observed scores and $\sigma_{Y_i}^2$ the variance of the component i for the sample. For this study the standardized Cronbach α was used. A high Cronbach α indicates a high degree of internal consistency (Thorndike, 1996). The desired cut-off value of the Cronbach α has been suggested as 0.70 (Carmines and Zeller, 1979; DeVellis, 2003). Validity is defined as the extent to which the instrument measures what it purports to measure. Construct validity of the instrument was evaluated by examining both inter-item correlation analysis and factor loading (Hair et.al, 1998). An inter-item correlation cut-off of 0.30 has been proposed (Hair et.al, 1998). Any items below the desired cut-off for item-to-total correlation and inter-item correlation respectively should be evaluated and consideration should be given to dropping the item from the scale.

The factor loading of the variables on the latent factor measures to what extent the latent factor explains the observed variance in the variable. The factor loadings are the regression coefficient between an indicator and its factor. Rules of thumb for assessing the practical significance of standardised factor loadings have been proposed (Hair et al, 1998). The factor loading is related to the sample size and a cut-off of 0.30 for a sample size of 350 and 0.35 for a sample size of 250, has been proposed. Smaller sample sizes have progressively higher cut-off for factor loadings. When the items have different frequency distributions more stringent cut-offs going from 0.32 (poor), 0.45 (fair), 0.55 (good), 0.63 (very good) or 0.71 (excellent) have been proposed (Comrey and Lee, 1992). To determine the

validity and reliability of the constructs IBM SPSS Statistics 20.0.0 software was used to perform the calculations. Shown in the table 3.4 below are the latent factors (with the constituent scale variable) Cronbach α , the factor loading of the variables on the latent factor and the item – total correlation.

Table 3.4: Data reliability and validity

Factor	α	Variables	Loading	Item-total
BI	0.695	Q147E: It would be good for you to bank through the Post Office	0.707	0.525
		Q147H: You would be keen to try banking products offered at the Post Office:	0.656	0.551
		Q152D: If you were to do banking, you would be willing to bank at the Post Office.	0.611	0.462
TSE	0.734	Q156D: Confidence using technology – Mobile money transfer (sending or receiving money)	0.479	0.430
		Q156E: Confidence using technology - ATM	0.658	0.571
		Q156G: Confidence using technology – Withdrawing cash at a supermarket till using your ATM or bank card	0.754	0.597
		Q156H: Confidence using technology – Getting bank notification via SMS	0.737	0.596
SOC	0.803	Q152J: You would bank at the Post Office if someone you respect like your favourite radio show presenter or DJ does	0.809	0.601
		Q152G: You would bank at the Post Office if your chief or community elders do.	0.783	0.669
		Q152A: You would bank at the Post Office if your family, friends or neighbours do.	0.694	0.691
PU	0.675	Q147C: You would use the Post Office to do banking because it would offer the services that	0.649	0.480

		you need.		
		Q147G: Banking at the Post Office would help you do things you already do but better.	0.646	0.481
		Q147J: Banking at the Post Office will allow you to do banking services that you cannot do yet.	0.633	0.513
PEOU	0.817	Q147B: Post Office banking products will be easy to understand.	0.560	0.506
		Q147D: The Post Office will make banking easier.	0.728	0.623
		Q147K: You would trust the Post Office for your banking	0.710	0.625
		Q147M: Banking through the Post Office will be easy to use.	0.771	0.690
		Q147L: Banking through the Post Office will be quicker than at normal banks.	0.686	0.615
ATT	0.946	Q142: Overall Postbank concept rating	0.892	0.860
		Q143: Postbank concept rating with regard to banking services.	0.890	0.860
		Q144: Postbank concept rating with regard to government services.	0.910	0.876
		Q145: Postbank concept rating with regard to other services.	0.914	0.879
TASK	0.835	Q135M: They speak your own language – Post Office	0.785	0.697
		Q135AC: They treat you well – Post Office	0.779	0.689
		Q135AS: You can depend on them to get things done – Post Office.	0.775	0.685
		Q135BA: They are cheap to use – Post Office	0.653	0.594
HED	0.705	Q152H: Banking at the Post Office will be comfortable.	0.676	0.568
		Q152E: You feel comfortable enough in a Post	0.591	0.480

		Office to try using an ATM.		
		Q152C: Banking at the Post Office will be enjoyable.	0.747	0.525

From the analysis it was found that the Cronbach's α were acceptable. The highest Cronbach's α was 0.946 (ATT) and the lowest was 0.675 (PU). The average factor loading was 0.719. The highest factor loading was 0.914 and the lowest 0.479. Only one factor loading was below 0.55. The scales showed good internal consistency. A total of 5 out of 28 variables had item to total correlationslightly below 0.50, however these were mostly quite close to the 0.50 recommended cut off values. The lowest was 0.430 (Q156D - TSE). This question was regarded as quite important to the scale and considering the Cronbach's α for the scale was 0.734 it was decided to retain the item. The remaining four items had statistic of 0.462 to 0.481, which was considered close enough to 0.50 not to merit being dropped.Below in table 3.5 we show the Unidimensional inter-item correlations for each of the latent factors.

Table 3.5: Unidimensional inter-item correlations.

Factor	Mean	Min	Max	Range	Var.
TSE	0.430	0.331	0.571	0.240	0.008
ATT	0.813	0.790	0.828	0.038	0.000
SOC	0.577	0.529	0.643	0.114	0.003
TASK	0.558	0.492	0.618	0.126	0.003
PEOU	0.476	0.352	0.585	0.233	0.005
PU	0.413	0.385	0.430	0.045	0.001
BI	0.431	0.380	0.496	0.114	0.003
HED	0.447	0.390	0.508	0.117	0.003

The mean inter item correlations ranged from 0.413 (PU) to 0.813 (ATT). Only one factor (TSE) had a minimum inter item correlation below 0.35, scoring 0.331. The underlying variables were thus sufficiently unidimensional. As the scale had a Cronbach's α = 0.734 it was felt that this correlation was close enough to 0.35 not to warrant it being dropped. Overall the analysis of the reliability and validity of the scale was acceptable and the factors explained a significant portion of the variance in the variables, as evidenced by the factors loading.

3.6. Sample descriptive statistics

Following the data collection a statistical analysis of the data was performed using SPSS Statistics 20.0.0. The analysis provided descriptive statistics for the bottom of the pyramid as well as allowing comparison of bottom of the pyramid people who were banked to those who were unbanked. Appendix8.5 shows the frequency measures for the key variables in the study. Of the sample 61.2 percent were female while 38.8 percent were male. This ratio is higher than the ratio for the country, which is 51.5 percent female and 48.5 percent male. The difference may be due to the time of day when agents visited homes to conduct the survey with males away working, but may also indicate that in rural areas males migrate to the cities and remit money back to families. The portion of women who were unbanked was slightly lower than men. The bottom of the pyramid was found to reside overwhelmingly in rural areas. Some 79.3 percent of the sample lived outside of major urban areas. For unbanked respondents some 83.9 percent lived in rural areas.

The average age of the sample was 37.81 years with a standard deviation of 16.34. The average age of banked bottom of the pyramid respondents was slightly

higher than unbanked respondents. There was a significant failure to complete formal education at the bottom of the pyramid with only 2.6 percent of respondents having completed their schooling while 29.8 percent of respondents had no schooling at all. The ratio for various levels of schooling was similar between banked and unbanked portions of the bottom of the pyramid. The portion of banked respondents who had no schooling was, however, higher than for unbanked respondents. The problem of unemployment in South Africa is also clearly seen in the data, with a significant portion of the bottom of the pyramid respondents formally unemployed. Only 21.1 percent of respondents were formally employed compared to the national employment rate of 74.7 percent. The data indicates that the bottom of the pyramid bear a disproportionate share of the unemployed in the population. The formal employment rate for banked respondents was significantly higher at 29.5 percent when compared to unbanked respondents of whom only 10.8 percent are in formal employment.

South Africa has in recent years significantly expanded its social welfare program. At the bottom of the pyramid social grants were significant sources of income with 40.4 percent of respondents indicating that it was their primary source of income. In the absence of formal employment, respondents at the bottom of the pyramid are dependent on friends and family to provide financial support. This was particularly the case for unbanked respondents, 24.2 percent of whom reported this as their primary source of income. In the absence of formal employment it might be expected that self-employment would be higher than in the general population, but the data indicated low levels of self-employment. Home ownership rates were found to be high at the bottom of the pyramid, but

this may be due to the significant number of respondents who live in rural areas and who may reside in traditionally constructed homes.

The majority of respondents at the bottom of the pyramid (72.1 percent) were either unmarried, or not living with a partner. This figure was similar for banked and unbanked respondents. The average number of dependents was 2.81, but the standard deviation was high at 2.13. The average number of dependents for banked respondents was slightly higher than that for unbanked respondents. The most spoken language at the bottom of the pyramid was isiZulu (25.9 percent) followed by isiXhosa (22.7 percent). The number of respondents who cited English as their home language was very low. Between banked and unbanked respondents the spread of languages as home language was similar with the exception of isiXhosa. There was a significant difference in the number of banked people who cited isiXhosa as a home language when compared to unbanked respondents.

3.7. Factors associated with being unbanked

In order to determine which of the nine variables identified in the descriptive statistics were significantly associated with being unbanked at the bottom of the pyramid, a logistic regression was performed. Logistic regression has been used in other studies to determine the most important factors correlated with financial exclusion (Devlin, 2009; Johnson and Nino-Zarazua, 2011). A logistics regression is an ideal complement to multiple regressions due to its ability to utilise a binary dependent variable (Hair et.al, 1998). The variables that were used in the model were age (A), gender (G), urban vs. rural location (R), home ownership status (H), primary source of income (I), number of dependents (D), home

language (L), relationship status (R) and educational level (E). The form of the model, where UN is the dependent variable, unbanked status was;

$$UN = f(A, G, R, H, I, D, L, M, E) \quad [3.2]$$

IBM SPSS Statistics 20.0.0 was used to conduct the logistic regression. As all of the explanatory variables were categorical variables, they were modelled using the standard dummy variable procedure in SPSS 20.0.0, specifying simple comparisons and using the first mentioned category in each case as the reference category in the final model. Logistic regression is a statistical method for analysing a data set in which there are one or more independent variables that determine an outcome. The outcome is measured with a dichotomous variable. In logistic regression, the dependent variable is binary or dichotomous, i.e. it only contains data coded as 1 or 0. The goal of logistic regression is to find the most suitable model to describe the relationship between the dichotomous characteristic of interest and a set of independent variables. Logistic regression generates the co-efficients (and their standard errors and significance levels) of a formula to predict a logit transformation of the probability of presence of the characteristic of interest. Consequently the logistic regression expression was;

$$logit(p_{UN}) = b_0 + b_1A + b_2G + b_3R + b_4H + b_5I + b_6D + b_7L + b_8M + b_9E \quad [3.3]$$

where p_{UN} is the probability of being unbanked and b_i are the co-effecients of the expression. The Hosmer and Lemeshow (Hosmer and Lemeshow, 2000) goodness-of-fit test statistic was used to determine the significance of the results. The Hosmer-Lemeshow test is performed by dividing the predicted probabilities into

deciles and then computing a Pearson chi-square that compares the predicted to the observed frequencies. Lower values indicate a good fit to the data and, therefore, good overall model fit. The Hosmer-Lemeshow statistic is

$$H = \sum_{g}^{n} \frac{(O_g - E_g)^2}{N_g \pi_g (1 - \pi_g)} \qquad [3.4]$$

where O_g; E_g; N_g; π_g denote observed events, expected events, observations, predicted risk for the gth risk decile group and n is the number of groups. While the overall logistic regression may be a good fit to the data it may be that some of the variables are not significant in explaining the probability of being unbanked. The Wald statistic was utilised to determine the significance of individual co-efficient in the model. The Wald test (Polit, 1996; Agresti, 2007) establishes whether the parameters associated with a group of explanatory variables is zero. If for a particular explanatory variable, or group of explanatory variables, the Wald test is significant, then it would be concluded that the parameters associated with these variables were not zero, so that the variables should be included in the model. If the Wald test is not significant then these explanatory variables can be omitted from the model. The Wald statistic is

$$W = \frac{(\hat{\theta} - \theta_0)^2}{var(\hat{\theta})} \qquad [3.5]$$

where the maximum likelihood estimate $\hat{\theta}$ of the parameter of interest θ is compared to the proposed value θ_0 with the assumption that the difference between the two will be approximately normal. The results of the logistics regression are shown in appendix 8.6. The recommendation of Peng et.al, (2002)

was used in reporting the results of the analysis. The test of the full model against a constant only model was statistically significant, indicating that the predictors as a set, reliably distinguished between being banked versus unbanked at the bottom of the pyramid. The χ^2 = 162.8, p < .000 the Hosmer and Lemershow p = 0.216 indicating that the null hypothesis must be rejected viz. that the model equation is a constant. Prediction success overall was 69.8 percent (62.3 percent for predicting being unbanked and 74.3 percent for being banked).

The Wald test for each of the variables in the equation was determined. Gender was found to be insignificant in explaining being unbanked, with a Wald statistic of 2.247 and a p= 0.134. Home ownership (Wald statistic of 1.685 and a p=0.640) and relationship status (Wald statistic of 0.227 and a p=0.973) were also insignificant with respect to being unbanked. Area was also insignificant (Wald statistic of 2.836 and a p=0.092) indicating that living in a rural as opposed to an urban area by itself is not a significant predictor in being unbanked. The remaining variables in the model namely age, primary source of income, number of dependents, language and level of education were significant. For rural versus urban area's, it may be that those variable associated with being unbanked are more prevalent in rural rather than urban area's, and hence area by itself was not found to be associated with being unbanked.

For each of the significant variables a further regression was conducted to determine if all categories within the variable were equally significant, or if some were more significant than others. The results of the logistics regression with significant variables are shown in appendix 8.7. For age it was found that the respondents younger than 25 were significantly (p=0.010) associated with being

unbanked. The other age groups were not significantly associated with being unbanked with p values ranging from p=0.208 for the age bracket 35-44 to p=0.978 for the age bracket 25-34. The analysis showed that respondents younger than 25 were significantly likely to be unbanked. A cross check of the results was carried out by calculating the level of being unbanked for each age group. It was found that 78.1 percent of respondents younger than 25 were unbanked compared to the next highest age group (65-74) where only 52.6 percent of respondents were unbanked. In analysing the association of primary source of income with being unbanked, it was found that three categories of primary source of income were significantly associated with being unbanked. Surprisingly, the most significant category was people who received income from a job or paid work with a Wald of 30.676 and $p < 0.000$. The second most significant category with Wald of 18.377 and $p < 0.000$ were respondents whose primary source of income was child support grants, while unemployed respondents were also significantly associated with being unbanked.

The analysis of number of dependents indicated that having any number of dependents was significant with $p < 0.000$ for all categories. Inspection of the Wald values for number of dependents showed they were similar, although it was noted that the value was highest for respondents with 3 or 4 dependents. Because the significance for all categories was the same it could not conclusively be said that respondents with 3 or 4 dependents were more likely to be unbanked than those with fewer or more dependents. The analysis of which language groups are more likely to be associated with being unbanked was complicated by the very small samples sizes for some of the languages reported as being a first language. English (2 respondents) and iSiNdebele (12) were categories that had

small sample sizes and were close to, the minimum number of 10 events per independent variable that has been recommended for a valid logistic regression (Peduzzi et.al, 1996; Agresti, 2007). The fit of the regression for language was poor with Hosmer and Lemeshow of 0.024 and consequently it could not be determined with any level of confidence, which of the language groups were more likely to be unbanked.

For educational level it was found that all groupings of educational attainment were associated with being unbanked except respondents who had completed their formal education, who were not significantly associated with being unbanked. There was a relationship between degree of significance with being unbanked and level of education in that respondents with no formal schooling were the most significantly associated with being unbanked (p=0.000). The degree of significance decreased as educational levels rose with respondents having some high schooling having the lowest Wald value (6.640) and p=0.010. A crosscheck of degree of being unbanked as a function of educational level found that 71.4 percent of respondents who had no schooling were unbanked dropping to 52 percent of respondents who have some high schooling who are unbanked.

The logistic regression was repeated, removing the variables that were not significantly associated with being unbanked (gender, area, home ownership and marital status). The resultant analysis had a Hosmer and Lemershow statistic $\chi^2 =$ 6.832 with p = 0.555 (compared with p=0.216 before). Both results indicated a superior fit when compared to the model with nine variables and the prediction success overall was 70.6 percent (64.6 percent for predicting being unbanked and 75.5 percent for being banked). In terms of the independent variables, education

level was the most significant predictor of being unbanked with a Wald of 50.202 and $p < 0.000$. The second most significant variable was source of income while language was the third most significant variable. The final expression for the prediction of being unbanked at the bottom of the pyramid in South Africa was thus:

$$logit(p_{UN}) = 3.74 - 1.81A + 0.85I - 0.81D - 0.92L - 3.87E \quad [3.6]$$

According to the model the probability of being unbanked at the bottom of the pyramid were negatively associated with age, number of dependents, language and educational levels. People younger than 25 were more likely to be unbanked, while having no dependents and improved levels of education was more likely to reduce the odds of being unbanked. The finding regarding income was surprising and interesting. While unemployed people and those receiving child support grants were more likely to be unbanked the finding in respect of formal employment was a surprise. It may indicate that at the bottom of the pyramid, those in formal employment may be in low-level jobs where remuneration is still paid in cash rather than into a bank account.

3.8. Intermediary adoption at the bottom of the pyramid

The research sought to investigate the adoption of financial services through an intermediary. It was thus important to test adoption propensity of bottom of the pyramid people to make use of financial services through an intermediary. In evaluating the propensity of unbanked bottom of the pyramid people to use specific channels for financial services a sample of 341 respondents who had indicated they did not hold a bank account was analysed. Survey evidence

suggests that the main reasons poor people did not use bank accounts were that: (1) they do not trust the bank, (2) service is unreliable and (3) withdrawal fees are prohibitively expensive (Dupas and Robinson, 2012). The majority of the financially excluded people are low-income individuals and stereotypes and misconceptions about the poor may cause providers to treat them differently from other clients. The experience or perception of how they will be treated by formal providers of financial services may trigger self-exclusion.

South Africa has 11 official languages, however communication relating to financial services takes place mostly in English. Language is of interest as bottom of the pyramid people who are unable to understand the language of financial services and may not be able to explain their needs. They may further not be able to make enquiries when they encounter service providers unable to engage with them in their mother tongue. Channels are the delivery mechanism through which banking services are provided. Post offices, supermarkets, Cell phone providers and other non-traditional outlets offer potential for expansion of access to financial service delivery (Midgley, 2005; Kumar, 2006). To compare the adoption propensity between traditional banking channels and intermediaries such as the post office or supermarkets, respondents rating of four variables that had previously been shown to be barriers to adoption viz. trust, cost, language and how people were treated, were compared between channels. For each of the variables the responses of unbanked respondents per channel were compared. Respondents were asked to positively or negative associate each variable with each channel. To compare the resultant proportions, Cochran's Q test was used, as the independent variables were all dichotomous. The Cohran's Q test statistic is (Conover, 1999);

$$Q = \frac{k(k-1)\left(\sum_{j=1}^{k}\left(X_j - \frac{N}{k}\right)^2\right)}{\sum_{i=1}^{b} X_i(k - X_i)} \qquad [3.7]$$

where k is the number of channels, X_j is the column total for the j^{th} observation, b is the number of groups, X_i is the row total for the i^{th} block and N is the grand total. As three groups of responses were compared it is necessary to use the Bonferroni adjustment (Tabachnick and Fidell, 2007). The Bonferroni adjustment involves setting a more stringent level for each comparison, to keep the across all the tests at a reasonable level. The correction entails dividing the level (0.05) by the number of comparisons that were compared (3) and then using this new value as the required level. The statistically significant using the Bonferroni correction was thus 0.167. The results of Cochran Q test for each variable are shown in appendix 8.8. For all four variables it was found that the p value was less than the Bonferroni corrected value of 0.167.

For the statement "you trust them with your money" p=0.016 was found, for the statement "they are cheap to use" p=0.000 was found, for the statement "they speak your language" p=0.000 was found and for the statement "they treat you well" p=0.000 was found. There are thus statistically significant differences in unbanked bottom of the pyramid respondent's views across the channels for each of the statements posed.In order to determine, for each variable, which channel had a lower or higher relative acceptance post-hoc comparisons were conducted. Post-hoc comparisons are designed to guard against the possibility of an increased type 1 error due to the large number of different comparisons being made to determine if there was a significant difference. The McNemar test was

used to conduct the post-hoc comparison. The McNemar's test (McNemar, 1947) is a non-parametric test that is used to compare two population proportions that are related or correlated to each other. It is applied using a 2×2 contingency table with the dichotomous variable. The test statistic is;

$$\chi^2 = \frac{(b-c)^2}{b+c} \qquad [3.8]$$

where b and c are the outcomes for the two channels compared. IBM SPSS Statistics 20.0.0 was used to conduct the data analysis. IBM SPSS applies the Yates correction for continuity. The effect of Yates's correction is to prevent overestimation of statistical significance for small data (Yates, 1934). The test statistic with the Yates correction is;

$$\chi^2 = \frac{(|b-c|-0.5)^2}{b+c} \qquad [3.9]$$

there are several criticisms of the appropriateness of the Yates correction. In the analysis of 2×1 contingency tables, the p–values associated with the corrected statistic tend to overestimate the true p–values in the tails of the distribution and to underestimate them towards the centre (Agresti, 2002). As a result the p–values obtained with the continuity correction are much less accurate when the binomial probability p is substantially different from 0.5. It has been shown that the Yates's correction is systematically conservative when carrying out 2x2 tests (Maxwell, 1976). The analysis using the McNemar test was conducted with the Yates corrected and uncorrected version and the output of both are reported on. The findings were further tested for effect size.

The higher the effect size the greater the possibility that the measured effect is not a true effect. For 2x2 tables the most commonly used test for effect size is the φ coefficient, which is a correlation coefficient and can range from 0 to 1, with higher values indicating a stronger association between the two variables. Criteria for the relative size and influence of φ have been developed. Values of φwere 0.10 for small effect, 0.30 for medium effect and 0.50 for large effect (Cohen, 1988). φ values were determined for all post-hoc comparisons.

The results of the post-hoc comparisons using the Yates corrected and uncorrected McNemar test are shown in appendix 8.9. For trust, when comparing banks to the post office, χ^2=0.752 indicating that there was no difference in perceptions of trust between banks and the post office. A small size effect was recorded (φ = 0.078). When comparing banks to supermarkets χ^2=0.018. The uncorrected McNemar value was χ^2=0.0148. The effect size was minimal (φ = -0.167). The results show that bottom of the pyramid customers trust supermarkets more for financial services (24.9 percent) than banks (16.7 percent) or the post office (17.9 percent). For cost when comparing banks to the post office χ^2=0.000 and φ = 0.074. The uncorrected McNemar produced χ^2=0.000. The results indicated that bottom of the pyramid customers perceived the post office to be cheaper than banks, while the size effect was minimal. When comparing the post office to supermarkets the McNemar test produced χ^2=0.014 and φ = -0.104 (negligible size effect). The uncorrected McNemar produced χ^2 =0.011. Respondents perceived that supermarkets were cheaper to use (31.4 percent) than the post office (22.3 percent), which was higher than traditional banks (2.9

percent). The low responses recorded indicate that costs across all channels were seen as high.

For language when comparing banks to the post office χ^2=0.000 and φ = 0.314, indicating a medium size effect. The uncorrected McNemar result was χ^2=0.000. The results showed that bottom of the pyramid customers perceived that the post office was more likely to speak their language than banks. When comparing the post office to supermarkets χ^2=0.000 and φ = 0.068, indicating a small effect size. The uncorrected McNemar result was χ^2=0.000. The results showed that respondents perceived that supermarkets were more likely to speak their language (50.2 percent) than the post office (31.4 percent). On the final statement which relates to the perception of how well bottom of the pyramid customers are treated by each channel, the comparison between banks and the post office produced a McNemar χ^2=0.000 and φ = 0.082, showing small effect size. The uncorrected McNemar was χ^2=0.000. Respondents perceived they were treated better in the post office than traditional banks. When comparing the post office to supermarkets χ^2=0.000 and φ = -0.046, or negligible size effect. The result for the uncorrected McNemar was χ^2=0.000. The results show that bottom of the pyramid respondents perceived that they were treated better in supermarkets (38.4 percent) compared to the post office (22.3 percent) and traditional banks (8.8 percent).

Relative access of each of the three channels was evaluated by comparing what proportion of the unbanked respondents reported the availability of the channels in their community. Cost of access was corrected for by evaluating the proportion

of respondents who reported that the channel was within walking distance of their residence. The results for channel availability are shown in appendix 8.10. It was found, using the McNemar test, that there was no statistical difference between supermarkets and the post office in terms of availability of the channels within communities. The McNemar χ^2=0.615 with φ = 0.615, showing a large effect size on the results and they should thus be interpreted with some care. Both supermarkets and the post office appear to have greater availability than traditional banks. Some 36.4 percent of respondents indicated that a supermarket was within walking distance of their residence, 30.2 percent indicating a post office was within walking distance while 8.2 percent reported a bank branch within walking distance.

3.9. Conclusion

Using the LSM methodology, it was determined that people living in LSM 1-4 defined the bottom of the pyramid in South Africa. For the data collection an interviewer-administered questionnaire was developed and a sample of 1997 responses were collected. From this sample 695 were determined to be from the bottom of the pyramid, of which 341 were unbanked. From the sample it was determined that the bottom of the pyramid had high levels of formal unemployment, low levels of education and were heavily dependent on government grants as a primary source of income. Very few respondents had completed formal schooling. The bottom of the pyramid respondents was also overwhelmingly rural dwellers and the use of English as a home language was insignificant.

A logistic regression performed on the bottom of the pyramid showed that age, primary source of income, education level and home language were associated with being unbanked at the bottom of the pyramid. Adoption propensity of unbanked people through an intermediary was tested. It was found that supermarkets and the post office had higher adoption propensities than traditional banks, indicating that intermediary were viable channels through which to offer financial services at the bottom of the pyramid. A total of 29 questions were identified which were mapped to the 9 constructs in the proposed model. The Cronbach α for the constructs were all found to be acceptable. Both the validity and reliability of the constructs were acceptable and latent factors were found to explain a significant portion of the variance in the underlying variables. Analysis of the sample size showed that it was adequate and large enough to detect type II errors. The statistical power of the sample was good and the effect size was small. The sample size was thus appropriate to draw statistically significant findings from.